User Manual

Energy Storage System

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Providing **green**, **stable** and **safe** electric power.

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1 Brief Instruction

Energy storage system (ESS) P33B40 is designed and developed by BYD Auto Industry Company Limited, suitable for energy storage, power adjustment and frequency adjust occasions, combined with other generator can composed micro-grid systems, and can coordinate the output of each generator according to load requirements. In this way, the system provides the user with a flexible energy storage system.

2 Installation

NOTE: ***During the installation and operation process, it is forbidden for installer/customer to change the default setting and internal wiring of ESS, the doing so will void the warranty. If there are any special requirements needed, please contact your local dealer for support.***

2.1 Components List

After unpacking the system, please refer to the following table to check whether the components are complete, and free from damage.

Table 2.1 System Component

System Component		
1	Control Cabinet (PCS model, DCDC model, Distribution model)	1 PCS
2	Battery Cabinet (BMS control model, battery model)	1 PCS

2.2 Installation Place

ESS cabinet shall be placed on the plane ground and vertically installed. The proper placement of system cabinet would ensure the reliability and safety of batteries. If the site cannot meet the requirements, please stop the installation.

Warning:

① Ensure the installation place is with good ventilation, and the ambient environment meets the operation requirements of product;

② No flammable and explosive goods shall be placed within 4 meters of system;

③ Ambient temperature for the installation should be in the range of -10℃ to 50℃.

Warning:

① Smoking and fireworks are not allowed near the batteries;

② Ensure the environment of system cabinet is clean and ventilated;

③ Ensure the cable meets the standard; any incompetent cable may cause a fire.

2.3 Electric Connection

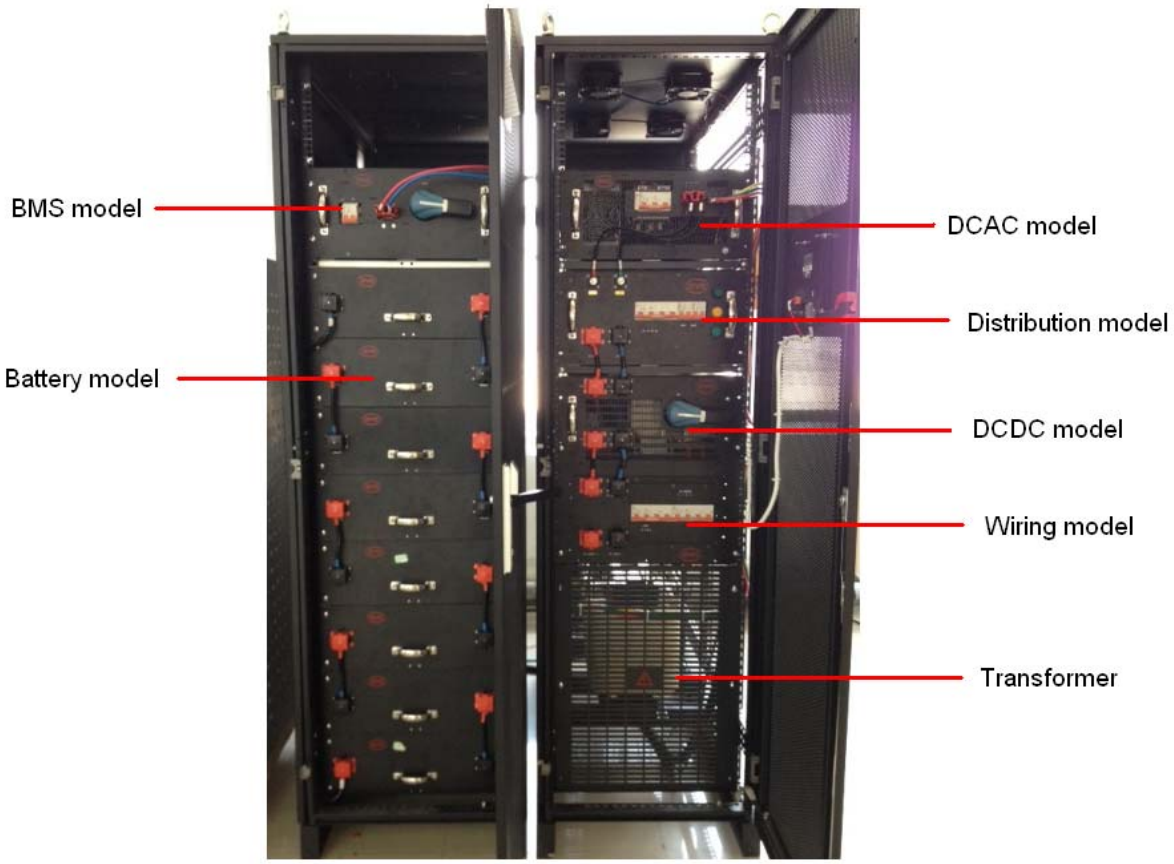


Figure 2.1 System component (the front of ESS)

Power Line Connection

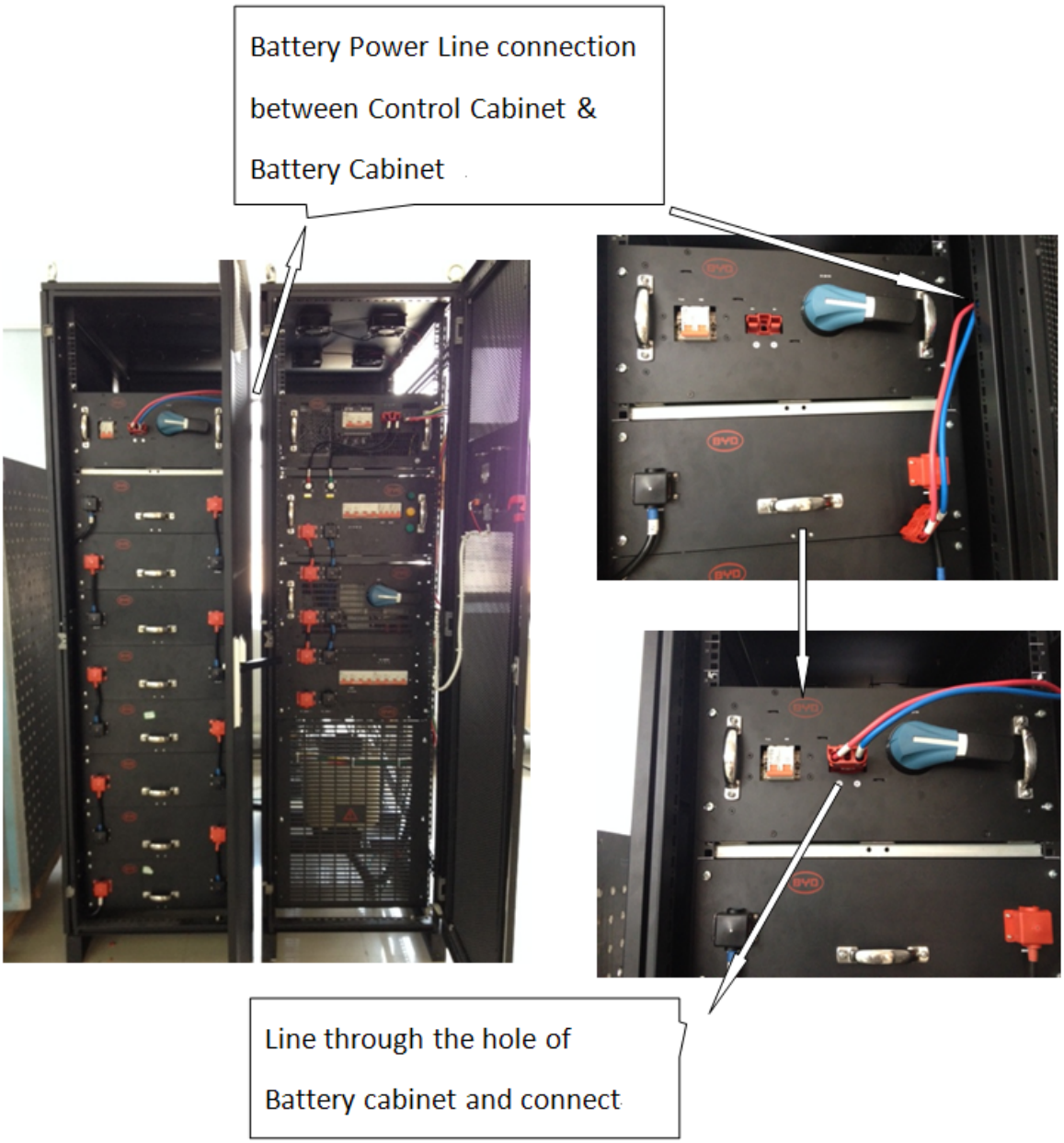


Figure 2.2 Power line connection between Control Cabinet & Battery Cabinet (the front of ESS)

Communication Line Connection

Table 1.1 Communication line connection

Cable mark	Corresponding terminal
CAN#3	CAN(H/L)/
	85V-264VAC

Figure 2.3 Communication line connection between Control Cabinet & Battery Cabinet (the back of ESS)

Terminal Block Connection

Table 1.2 Configuration Table of Terminals Connected

TERMINAL BLOCK	DESCRIPTION	Cable Specification (Recommended)
PV INPUT + PV INPUT -	PV panel connection terminal (20kW)	6mm^2
LOAD U V W N	Load connection terminal (20kW)	6mm^2
AC SOURSE U V W N	AC source connection terminal (20kW)	16mm^2
PE		

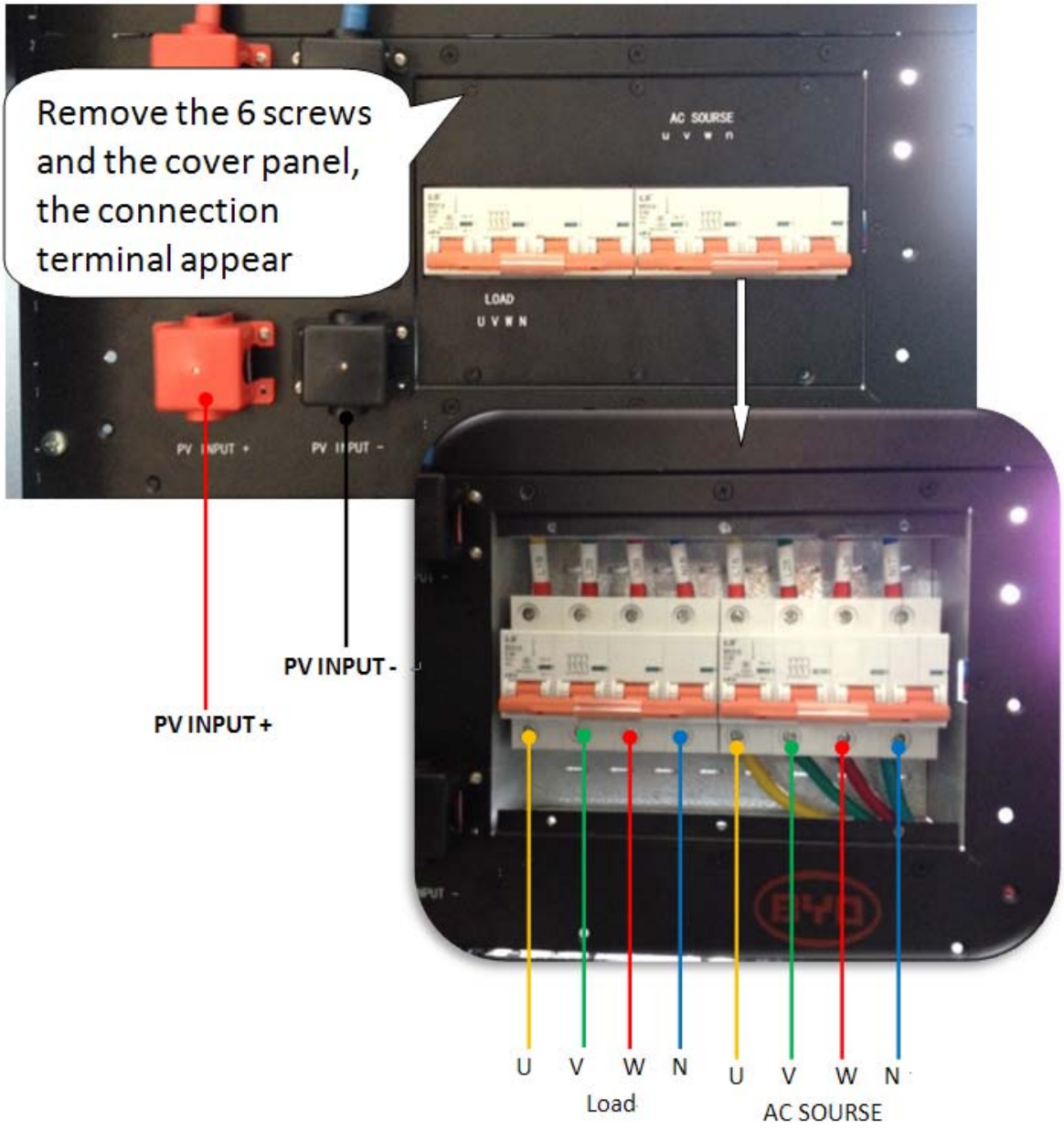


Figure. 2.4 Terminal connection (Wring model, the front of ESS)

2.4 Startup

2.4.1 System Operating Position

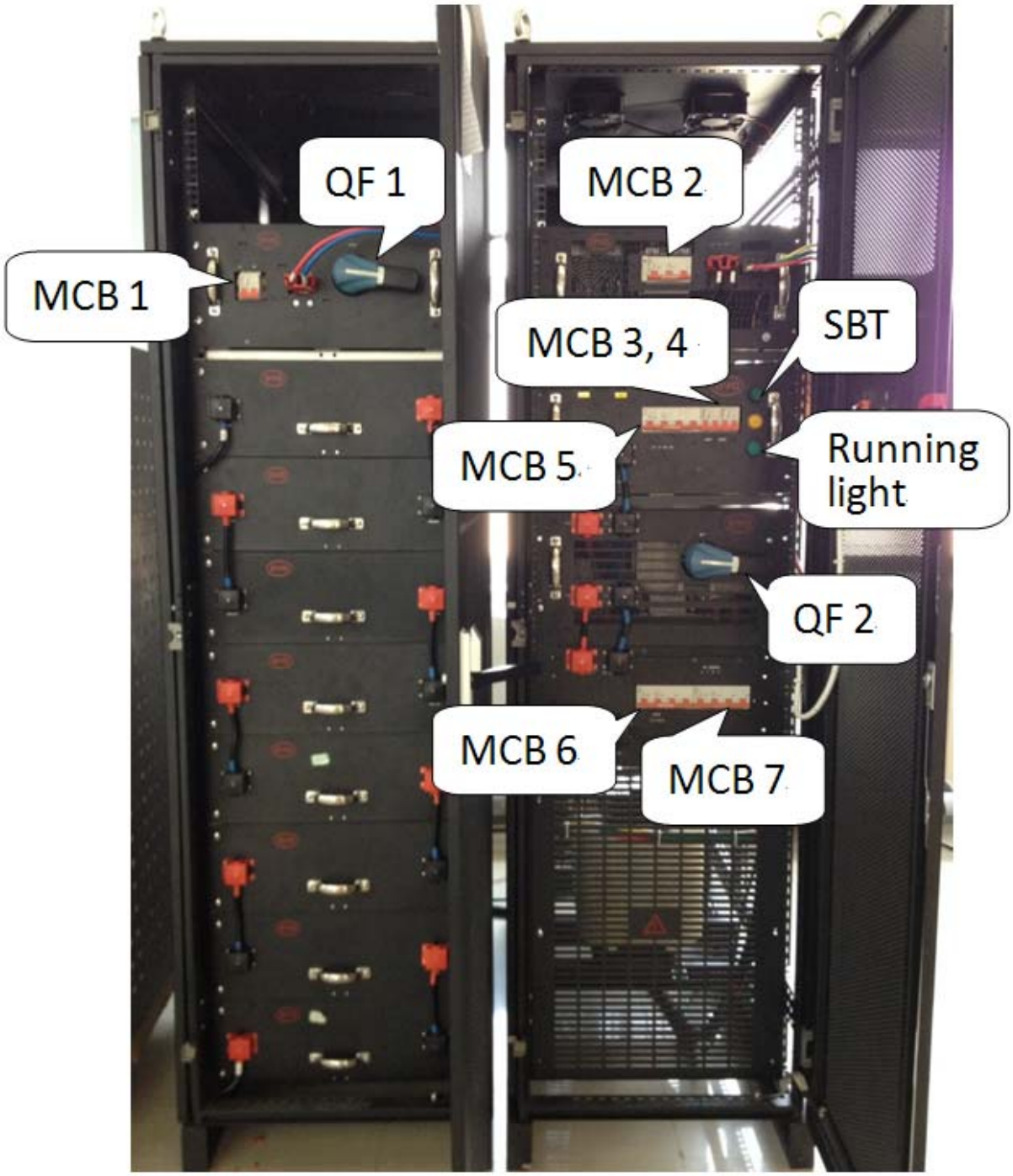


Figure. 2.5 ESS breakers and switches (the front of ESS)

Figure. 2.6 breaker at the back of ESS

2.4.2 System Startup

1. Switch on MCB 6 and MCB 7of wiring model;
2. Close the breaker QF 2 of DCDC model;
3. Close the breaker QF 2 and switch on MCB 1 of DCDC model;
4. Switch on MCB 8 at the back of ESS;
5. Switch on MCB 3, MCB 4 and MCB 5;
6. 1) If there is PV input, the system will power up and the running light will lighting;

   2) If there is no PV input, press “SBT” button for 5 seconds, the system will power up and the running light will lighting, and the HMI starts up normally;

3 Operation

3.1 Main interface

After power up, the HMI enter main interface:

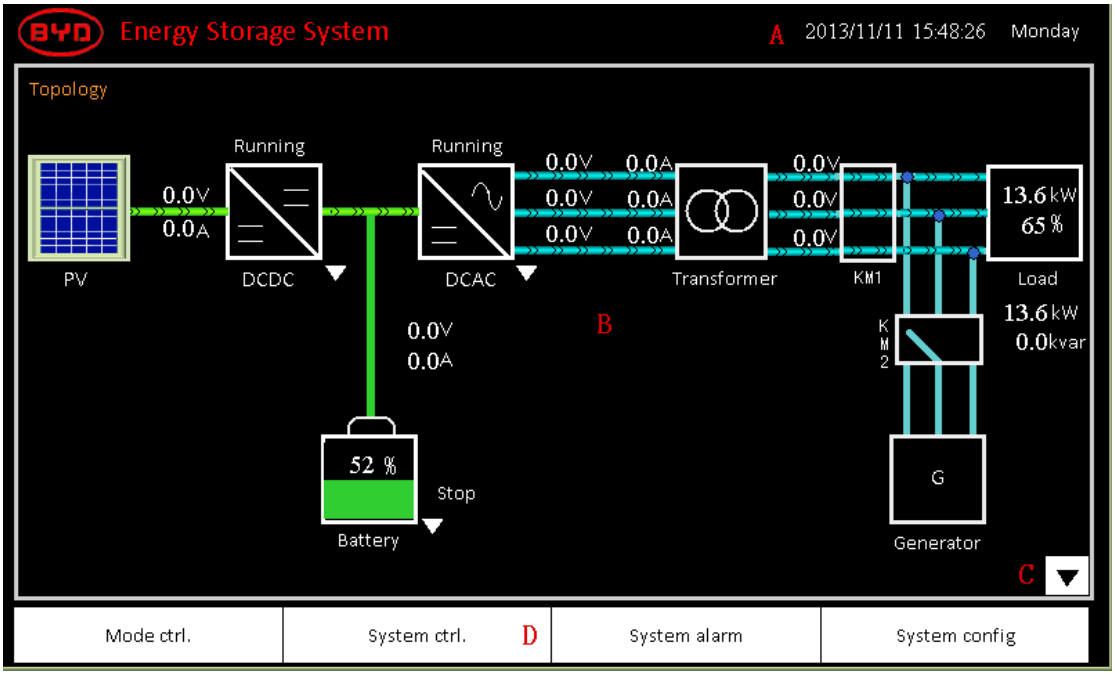


Figure 3.1 Main Interface

Table 3.1 Main interface introduce

Screen mark	Introduction
A	System time, click it can enter time setting interface
B	System topology, click ▼ to query the work state of each module, and click breaker KM1, KM2 can control them when fulfill work condition
C	Click it can query ESS output curve
D	Control bar, have 4 sub menus: mode control, system control, system alarm and system configuration

ESS set permissions for operation control, enter sub menu on control bar need password login, and click any sub menu password keypad appear:

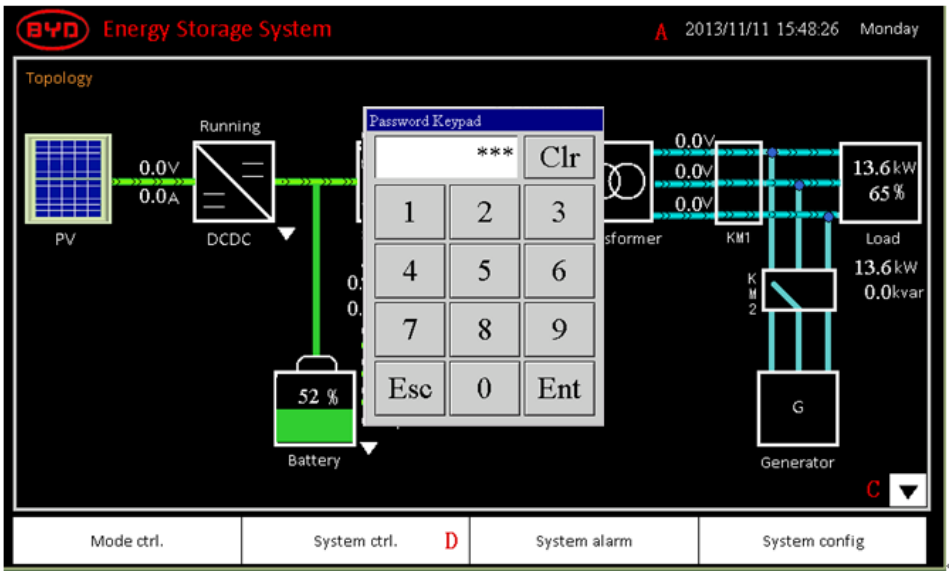


Figure 3.2 Password keyboard

Click the numbers in the keyboard to input password，the default password is 123.

Clr: clear input number; Esc: exit, close the keyboard; Ent: enter, confirm the input number and close the keyboard

NOTE:

Sub menu automatically logout when no operation for 5 min and enter screensaver mode, click HMI to return main interface.

To prolong the HMI life, HMI backlight automatically turn off when no operation for 10 min, click HMI to return screensaver mode.

3.2 Work modes

3.2.1 Auto-local working mode

Click “Mode ctrl.” and enter password. The default working mode of ESS is Auto-local.

Auto-local working mode: under this mode ESS will run automatically according to the battery SOC and the DCAC configuration. DCAC configuration introduce in 4.2.4

Table 3.2 Default DCAC configuration and the ESS working

DCAC configuration item	Default value	Introduction
SOC of ESS supplying power	95%	ESS automatically close KM1 and supply power to the load when battery SOC is higher than 95%
SOC of diesel engine supplying power	10%	ESS automatically open KM1 and close KM2 when battery SOC is lower than 10%
SOC of DCAC starting	50%	When battery SOC is higher than 50%, click KM1can manual close it, and ESS supply power to the load

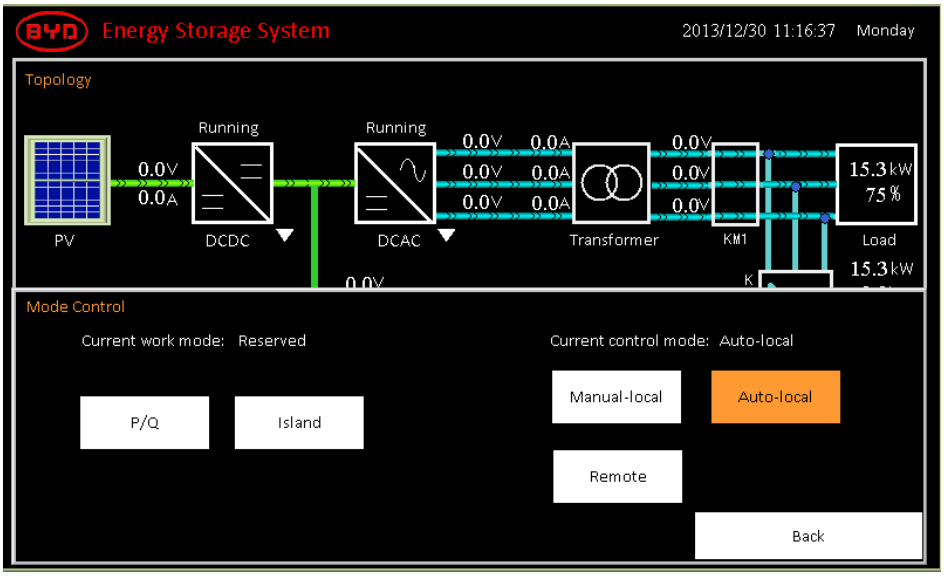


Figure 3.3 Default Mode control interface

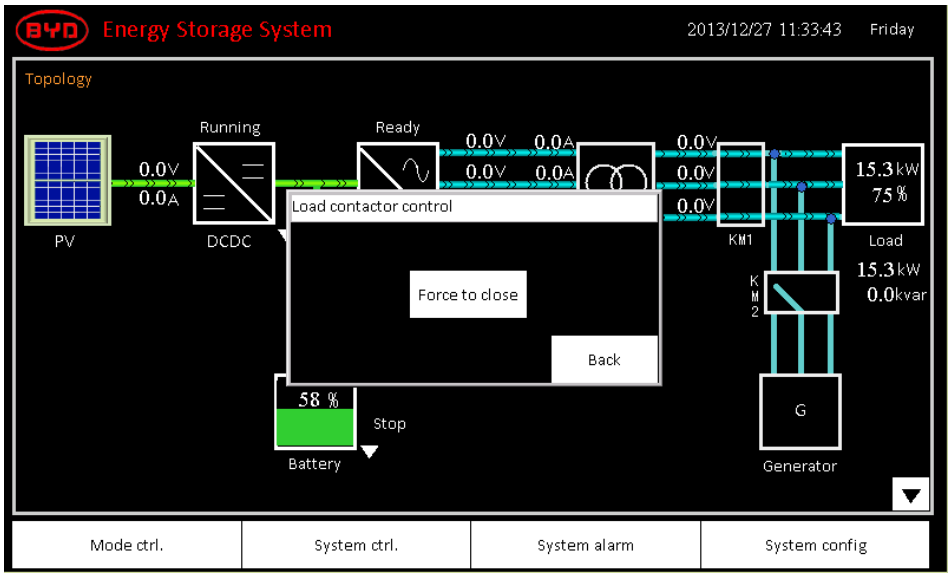


Figure 3.4 KM1 manual close interface

3.2.2 Manual-local working mode

Manual-local working mode: under this mode ESS will run automatically according to the battery SOC, the DCAC configuration and system control command.

In default mode control interface, click “Manual-local” button, the “manual -local” button becomes orange and the current control mode switches to manual local control.

ESS working state is similar to auto-local working mode, the difference is you can control the ESS standby and stop in “System ctrl”.

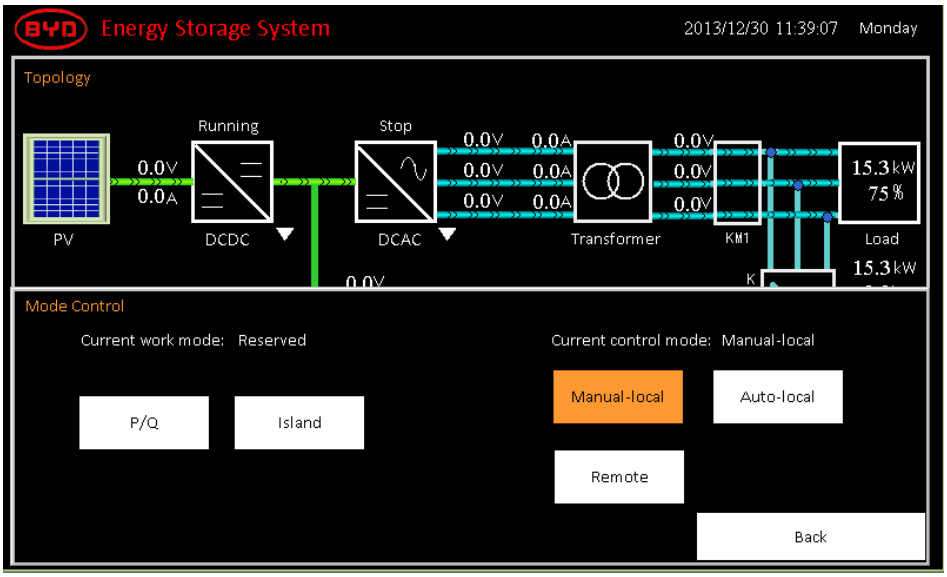


Figure 3.5 Manual-local Mode control interface

Back to main interface and enter “System ctrl”.

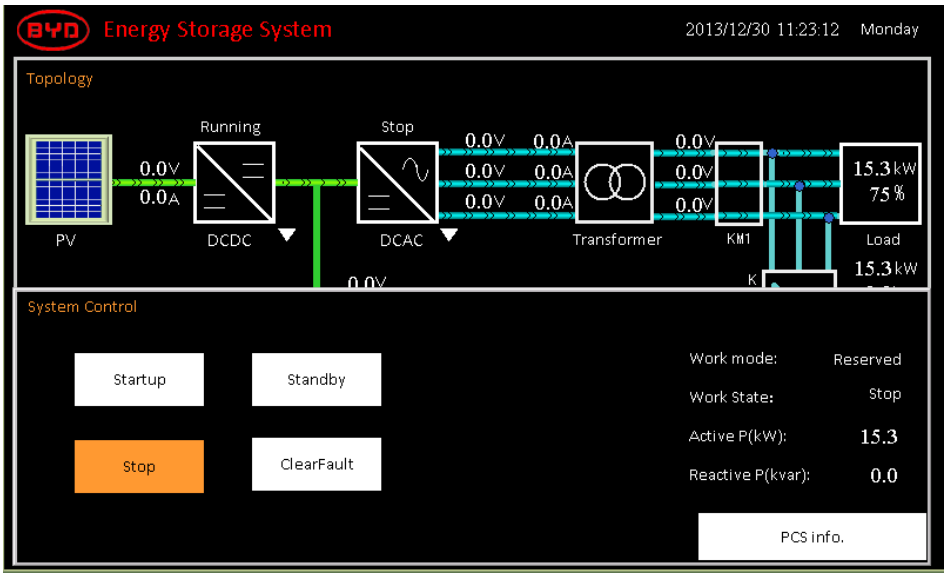


Figure 3.6 System control interface

Click the “Stop” or “Standby” button in system control interface to stop or standby the ESS.

NOTE:

Only in Manual-local working mode the standby and stop operation in system control is effective.

In Auto-local working mode system will continues working as long as external condition fulfilled, you need to switch to Manual-local working mode if you want to stop the ESS.

3.2.3 Remote working mode

Remote working mode: under this mode, ESS will be control by remote terminal, HMI cannot control the system.

In default mode control interface, click “Manual-local” button, the button turn orange and the current control mode switches to manual local control.

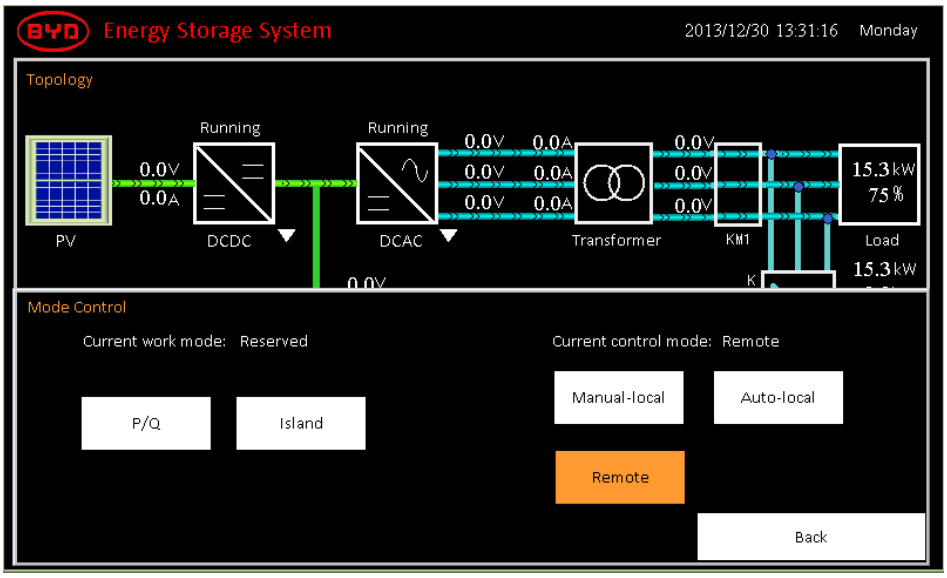


Figure 3.7 Remote Mode control interface

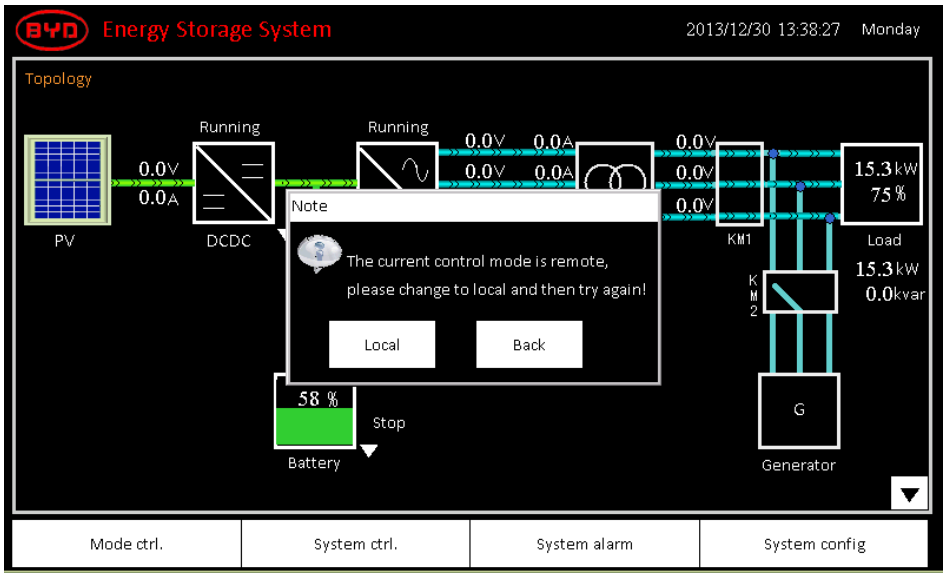


Figure 3.8 HMI cannot control ESS under remote mode

3.2.4 DCAC configuration

The DCAC configuration decides the ESS local working, and the default value can be modified.

Click DCAC button to enter ACDC monitoring interface

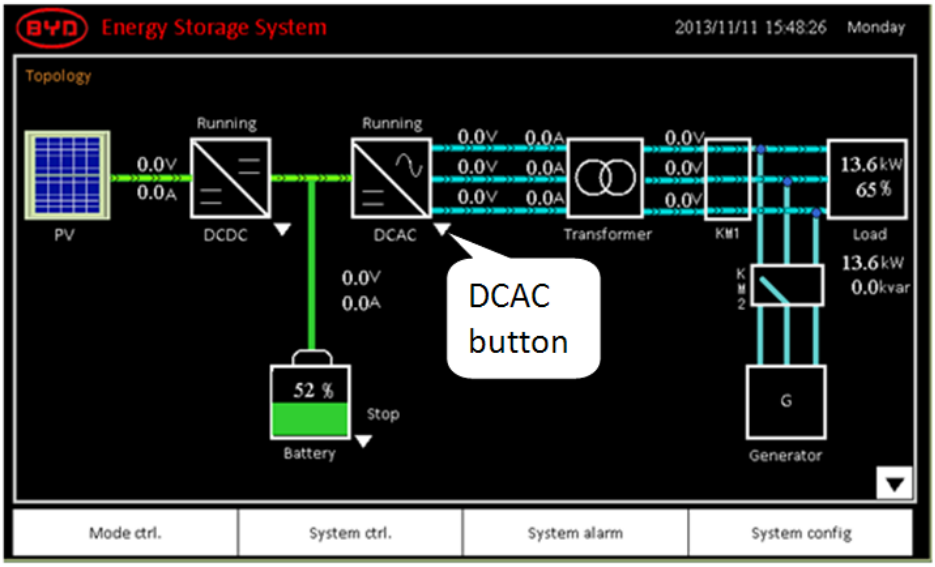


Figure 3.9 DCAC button

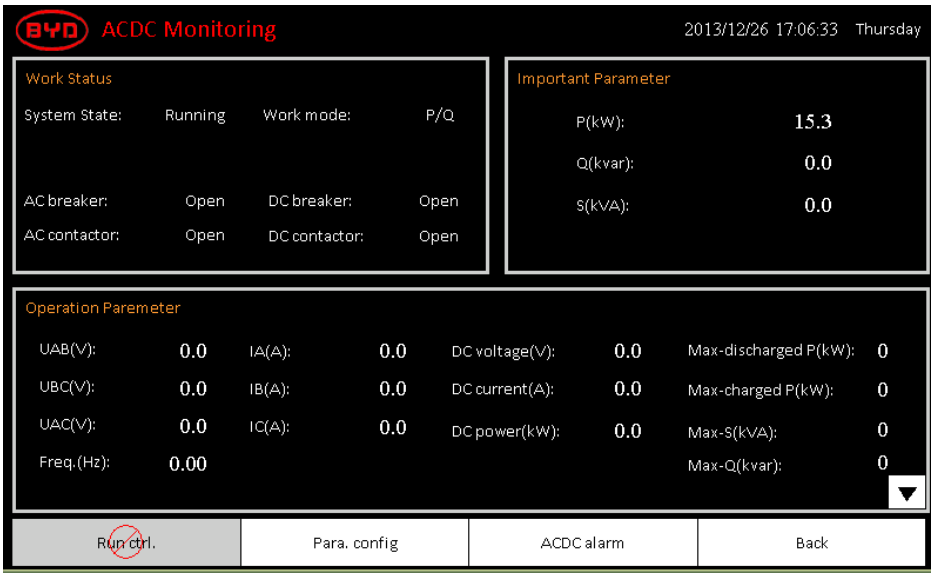


Figure 3.10 ACDC monitoring interface

Click “Para.config” to enter ACDC parameter configuration interface

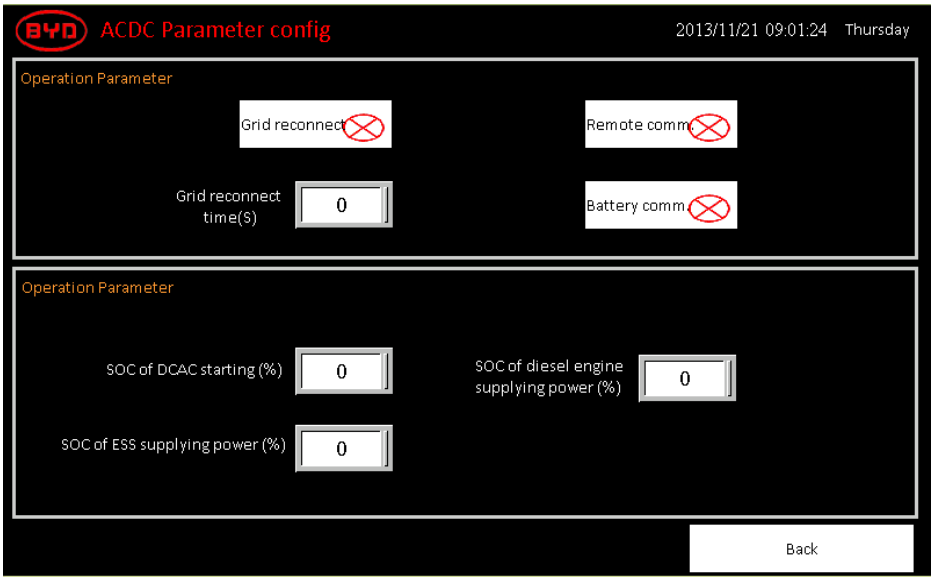


Figure 3.11 ACDC parameter configuration interface

The default DCAC configuration value can be change here.

NOTE:

The logic of the three SOC:

SOC of diesel engine supplying power ＜ SOC of DCAC starting ＜ SOC of ESS supplying power

4 System setting and maintenance

4.1 System setting

Click “system config.” on main interface to enter system setting interface.

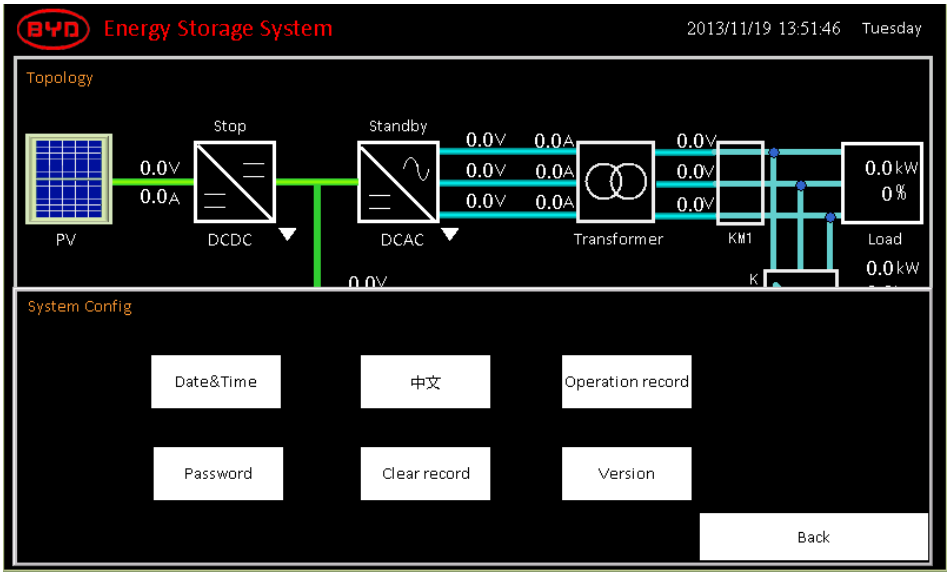


Figure 4.1 System configuration interface

Contains:

1. Setting the date & time, language, password
2. Query the operation record, version of software
3. Clear record of historical alarm

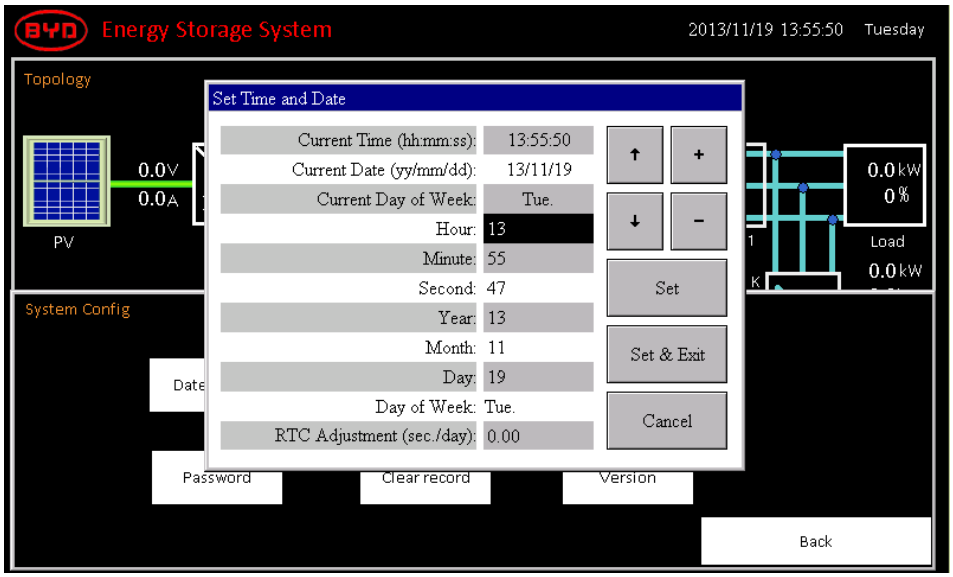


Figure 4.2 Date&Time setting

4.2 Maintenance

4.2.1 Fault clear

If the component of ESS in fault condition, the component frame become red in main interface:

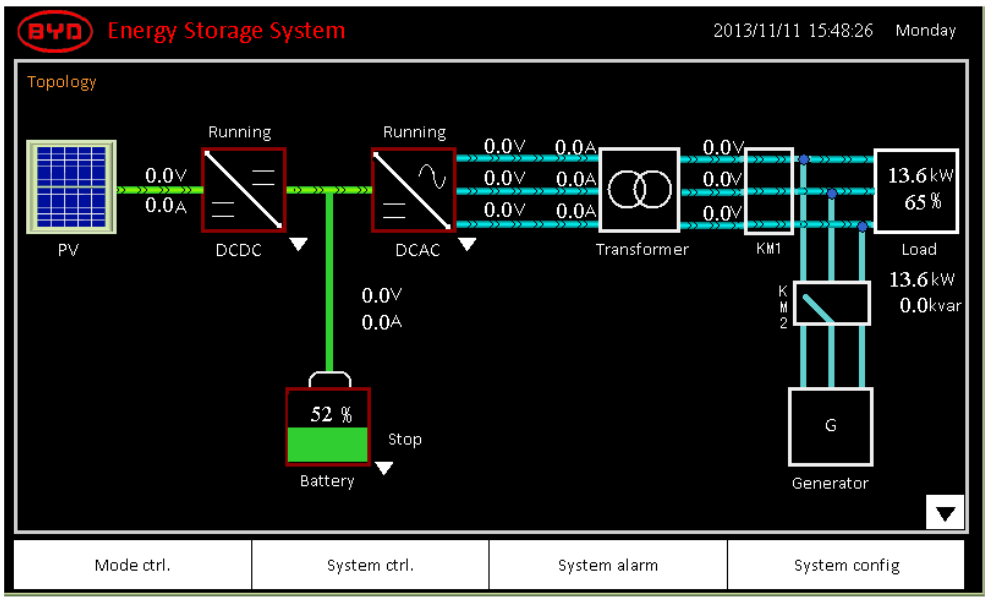


Figure 4.3 Componet frame become red when fault occur

Back to main interface and enter “System ctrl”, click “clear fault” button to clear the fault

NOTE:

If click the “clear fault” button when there is no fault, ESS will stop working.

4.2.1 System alarm

Click “System alarm” in main interface to query current system alarm.

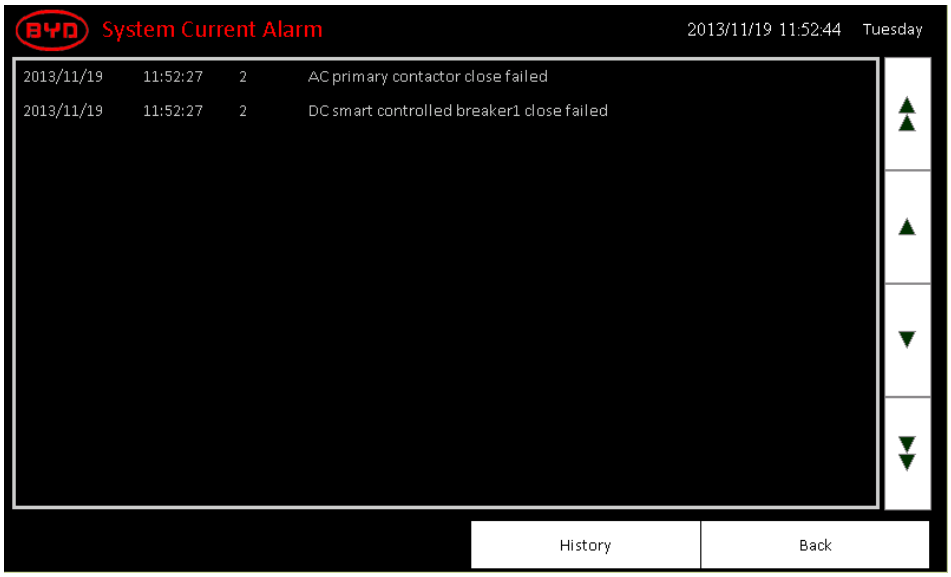

System Current Alarm
2013/11/19 11:52:44 Tuesday
2013/11/19 11:52:27 2 AC primary contactor close failed
2013/11/19 11:52:27 2 DC smart controlled breaker1 close failed
History
Back

Figure 4.4 System current alarm

Click “History” button in system current alarm, can query the system history alarm

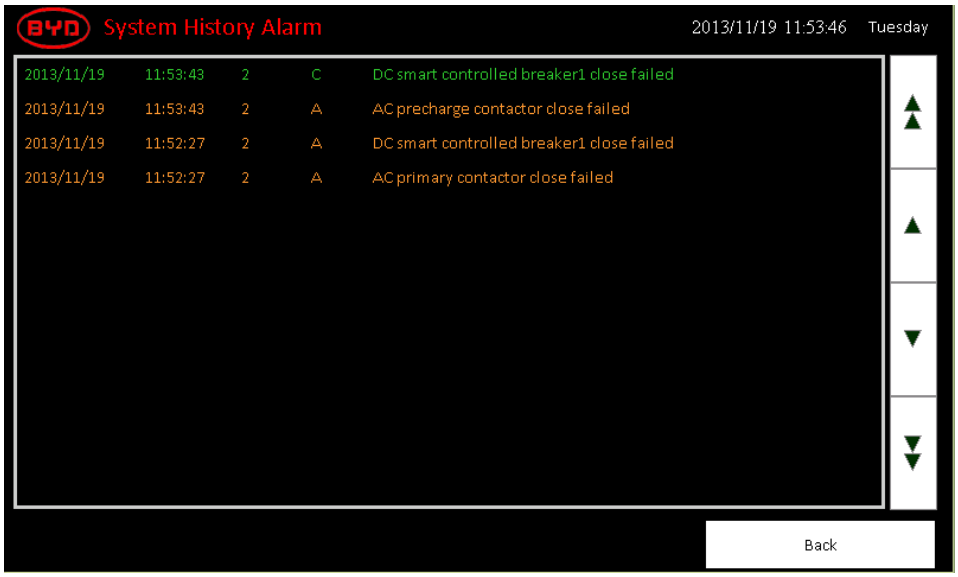
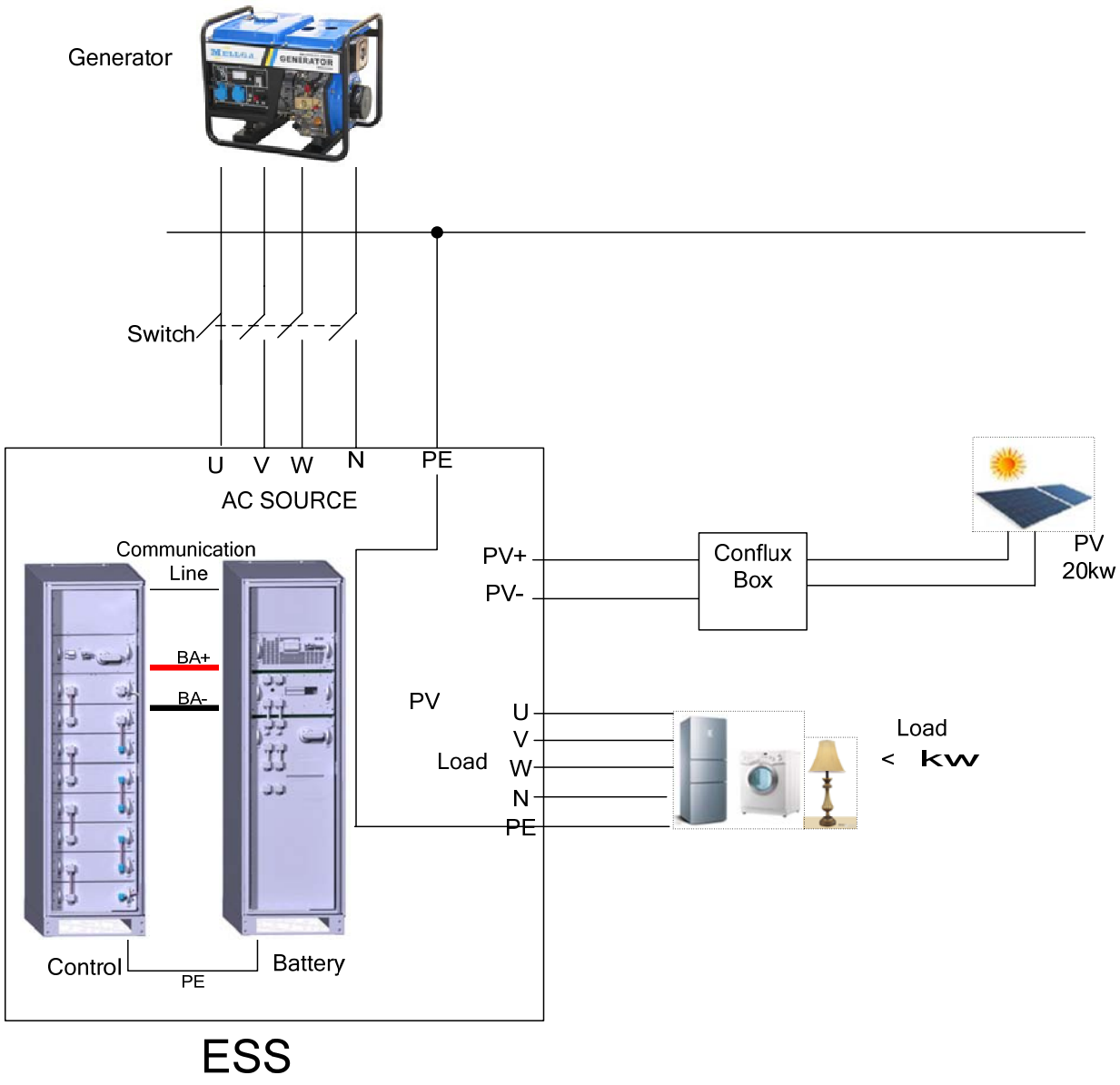

System History Alarm
2013/11/19 11:53:46 Tuesday
2013/11/19 11:53:43 2 C DC smart controlled breaker1 close failed
2013/11/19 11:53:43 2 A AC precharge contactor close failed
2013/11/19 11:52:27 2 A DC smart controlled breaker1 close failed
2013/11/19 11:52:27 2 A AC primary contactor close failed
Back

Figure 4.5 System history alarm

ESS Connection Topology



ESS Specification

Item		P10B40-C20-220/60
PCS Parameter	Nominal Power	20KW
	Output Voltage	220V/L-N
	AC Phase	Three-phase Four-line +PE
	Nominal Current	55A
	Nominal Frequency	60HZ
	Allowable Frequency Range	57～60.5HZ
	Max. Efficiency	97.50%
	Power Factor	－1～1
	Current THD (On-grid Operation)	<3%（Nominal Power）
	Voltage THD (Off-grid Operation)	<5%（Nominal Power）
	Operation Mode	On-grid Operation; Off-grid Operation; Micro-grid Operation
	Over-load Capability	1.1 times 1min,1.2 times 10s
PV Charger Parameter	Nominal Power	20KW
	PV Voltage Range	250～350V
Battery Parameter	Nominal Voltage	409.6V
	Energy Storage Capacity	40KWh
System Parameter	Communication Interface	RS485
	Cabinet Protection Grade	IP20 (Indoors)
	Environment Temperature	-10～+50℃
	Relative Humidity	5～95% (No Condensation)
	Max. Altitude	3000m
	Cooling Method	Forced Air Cooling
	Dimension (L*W*H)	1200*1200*2100 mm
	Package Weight	1456 kg

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